

particular, claim 1 is now directed to cooling exhaust for exhaust gas recirculation (EGR). Claim 1 now recites an exhaust gas inlet with a cross-sectional flow area that exceeds that of the liquid inlet. Claim 1 also recites, more distinctly, positions of the exhaust gas inlet and outlet and the liquid inlet 5 and outlet (see, e.g., Fig. 1). These features pertain to functionality for EGR where the main goal is to cool hot exhaust gas without excessive mechanical losses, as some volumetric losses due to cooling of the exhaust are inevitable losses, as some volumetric losses due to cooling of the exhaust are inevitable (see, e.g., instant application at page 19, lines 10-11).

Further, Applicant draws the Office's attention to the following language, 10 which is original to claim 1: "*a liquid flow space defined by and between the cover plate and the upper plate*". Thus, as originally presented, claim 1 includes a liquid flow space defined, in part, by the cover plate. Such an arrangement can have associated advantages when compared to an exhaust 15 gas flow space defined by the cover plate (e.g., consider a cooling liquid adjacent the cover versus hot exhaust gas). Of course, where not explicitly recited, a cover plate may define an exhaust gas space.

Yet further, Applicant draws the Office's attention to the following language of claim 1, as currently amended: "*a lengthwise dimension that exceeds the widthwise dimension*" and "*an exhaust gas inlet opening positioned proximate to a widthwise side of the cover plate and an exhaust gas outlet opening positioned proximate to an opposing widthwise side of the cover plate*". 20

This provides, structurally, for exhaust gas flow across most of the length (i.e., the longer dimension) of the heat exchanger.

Applicant further draws the Office's attention to the following language of claim 1, as currently amended: "*a liquid inlet opening positioned proximate to an end of a lengthwise side of the cover plate and a liquid outlet opening positioned proximate to an opposing end of an opposing lengthwise side of the cover plate*". This provides, structurally, for liquid flow across most of the length of the heat exchanger. Hence, the particular positions of the openings have associated functionality.

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Rejection of Claims 1, 14-16, 20 and 21 under §102(b): Modine

The Office rejected claims 1, 14-16, 20 and 21 as being anticipated by Modine (DE 296 16 354). Anticipation under §102 requires that each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference, see MPEP §2131.

While Applicant currently amends claim 1, from which claims 14-16 and 21 depend, Applicant submits that the Modine reference does not disclose the recited seals. For example, the Modine reference relies on a "Distanzring 13" (see, e.g., Figs. 2 and 3 of the Modine reference). For at least this reason, Applicant asserts that the subject matter of claim 1 as currently amended, or as originally presented, is not anticipated by the Modine reference.

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Applicant submits that claims 14-16 and 21 are patentable over the Modine reference for at least the reason that they depend on claim 1. Claim 20 is canceled.

5    Rejection of Claim 13 under §103(a): Modine

The Office rejected claim 13 as being obvious over Modine (DE 296 16 354). Per MPEP §2143, to establish a prima facie case of obviousness, three basic criteria must be met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to 10 one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Applicant submits that claim 13, being dependent on claim 1, is patentable over the Modine reference for at least the 15 reasons presented with respect to claims 1, 14-16 and 21.

Claim 13 recites "*wherein the liquid flow space has a cross-sectional area and a height sufficient to maintain an average Reynolds number of greater than or equal to approximately 2000 for a liquid flow rate to the liquid flow space of greater than or equal to approximately 160 ml per second.*" As stated in the 20 instant application at page 14, lines 15-16: "In general, turbulence is associated with a decrease in boundary layer thickness". Applicant fails to find objective evidence of record that would support a suggestion or motivation to combine

the Modine reference with the given statement of one of ordinary skill and arrive at the subject matter of claim 13.

Rejection of Claims 2-12 under §103(a): Modine in view of Brenner

5       The Office rejected claims 2-12 as obvious over the Modine reference in view of USPN 6,318,456 to Brenner et al. Claims 2-12 depend on claim 1, and for the reasons above, Applicant submits that the Modine reference does not disclose the subject matter of claim 1. For at least this reason, Applicant submits that claims 2-12 are patentable over the combination of the Modine  
10     reference and the Brenner reference.

Applicant respectfully directs the Office to the discussion of claim 1 that appears above, i.e., just prior to discussion of the §102 rejection based on the Modine reference. Various features are discussed and Applicant submits that the subject matter of claim 1, as currently amended, is patentable over the  
15     combination of the Modine reference and the Brenner reference. For example, the combination of the Modine reference and the Brenner reference do not suggest the arrangement of openings of claim 1 (see, e.g., symmetry of the devices in the figures of the Modine reference (Fig. 1) and the Brenner reference (Figs. 1-12)).

Conclusion

Pending claims 1-16 and 21 are believed to be in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the present application. Should any issue remain that prevents 5 immediate issuance of the application, the Examiner is encouraged to contact the undersigned attorney to discuss the unresolved issue.

Respectfully Submitted,

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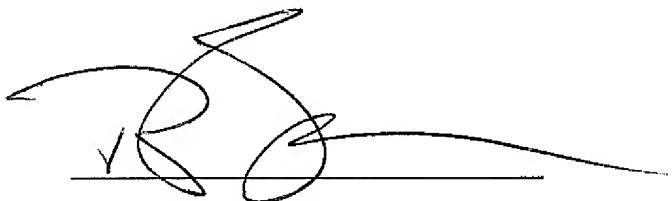
Lee & Hayes, PLLC

421 W. Riverside Avenue, Suite 500

Spokane, WA 99201

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Name: Brian J. Pangrle

Reg. No. 42,973

Phone No. (509) 324-9256 ext. 231